Comparison of real-time PCR and cultural method for detection of bacterial load in pasteurized milk

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Abstract

In this study, we used a TaqMan® probes through the real-time polymerase chain reaction (PCR) technique as a rapid and sensitive way to detect bacterial load of pasteurized milk. The reaction was optimized for enumeration of bacteria in pasteurized milk samples. In parallel, the same milk samples were assessed by conventional cultural-based method. The correlation between methods was evaluated by Bland Altman analysis. The minimum and maximum value for conventional culture-based method were 0 and 10,000 cfu/ml while qPCR gave us 55 and 7,071 (Bacteria/ml of pasteurized milk), respectively. Results indicated that Taq Man real-time PCR provides a useful tool for rapid and accurate quantification of bacterial load.

Practical applications

Dairy industries are required to determine total bacterial load in farmer's raw milk before collection based on legal standard methods for microbial detection. Moreover, the result of total bacterial counting is the major pricing criterion of raw milk. Despite the storage of raw milk from large farms in separate tanks, raw milk from small- and medium-size farms are mixed in other tanks resulting in total bacterial load alteration. Traditional cultural-based methods are common to determine total bacterial load in raw milk. However, these techniques are laborious and timeconsuming. Recent molecular-based methods are easily applicable to ensure that perishable raw milk could be monitored precisely under national rules and legislation in the shortest possible time. This report provides the details of a TaqMan real-time PCR (qPCR) that can be used in factory sites for accurate monitoring of raw milk bacterial load before transferring the raw milk into pasteurization line.